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APPARATUS AND METHOD FOR ALLOCATING CHANNEL BETWEEN MSC AND IWF UNIT IN CDMA MOBILE COMMUNICATION SYSTEM

Field of the Invention

This invention relates to a device and method for allocating a channel in a code division multiple access (CDMA) mobile communication system; and more particularly, to a device and method for allocating an E1 channel between a mobile switching center (MSC) and an interworking function (IWF) unit in a CDMA mobile communication system.

Description of the prior Art

CDMA radio data service currently in service is provided based on IS-95A standard that supports low speed (8/13 Kbps) data service. CDMA radio data service based on IS-95B standard is to be provided at higher speed (64Kbps), so that relatively more data are expected to be processed during predetermined time.

Currently, in order to allocate a channel between a mobile switching center (MSC) and an inter working function (IWF) unit, an E1 channel allocation method of assuming 5 channels to be one super channel is employed. The E1 channel allocation method is suitable for a data service at low speed based on an IS-95A, however in case this allocation method is applied to a data service at high speed based on an IS-95B,

there is a problem that a call disconnection is frequently occurred during call processing to thereby drop quality of the service since a traffic path congestion is occurred many times due to an increase in data quantity that is to be processed at the same time zone.

Summary of the Invention

It is an object of the present invention to provide an apparatus and method for allocating an E1 channel between an MSC (mobile switching center) and an IWF (interworking function) unit in a code division multiple access (CDMA) mobile communication system, wherein an E1 super channel can be variably allocated to support both an IS-95A service for low speed and an IS-95B service for high speed.

In accordance with an aspect of the present invention, there is provided an apparatus for allocating an E1 channel between an MSC (mobile switching center) and an IWF (interworking function) unit in a code division multiple access (CDMA) mobile communication system, the apparatus including a channel buffer for receiving and storing call processing data; a transmission SI RAM for storing E1 channel allocation information; a reception SI RAM for storing the E1 channel allocation information; a CPM for reading out the call processing data that are stored in the channel buffer, storing received call processing data in the channel buffer, determining which ones of high speed calls and low speed calls

are more included in a plurality of call types in process currently and modifying the E1 channel allocation information stored in each of the transmission SI RAM and the reception SI RAM; a multi channel controlling unit for reading out the E1 channel allocation information stored in each of the transmission SI RAM and the reception SI RAM and allocating a super channel including 5 channels or a super channel including 10 channels to the E1 channel; and a serial-parallel converting unit for converting the call processing data from the CPM to serial data and then transmitting the serial data to the IWF unit; and converting the call processing data from the IWF unit to parallel data and then transmitting the parallel data to the CPM.

In accordance with another aspect of the present invention, there is provided a method for allocating an E1 channel between an MSC and an IWF unit in a CDMA mobile communication system, the method including the steps of: by a CPM, receiving call type information about a plurality of call types in process currently from the high-level processor; by the CPM, determining which are more included in the plurality of call types in process currently, high speed calls or low speed calls based on the call type information; if the high speed calls are more included in the plurality of call types in process currently, by the CPM, designating first/second super channel storage space for high speed of each transmission/reception SI RAM as an active zone and first/second super channel storage space for low speed of each

transmission/reception SI RAM as a shadow zone; and by a multi channel controlling unit, reading out the E1 channel allocation information that is stored in each of the first/second super channel storage space for high speed and allocating a super channel including 10 channels for high speed to the E1 channel; if the low speed calls are more included in the plurality of call types in process currently, by the CPM, designating first/second super channel storage space for low speed of each transmission/reception SI RAM as the active zone and first/second super channel storage space for high speed of each transmission/reception SI RAM as the shadow zone; and by the multi channel controlling unit, reading out the E1 channel allocation information that is stored in each of the first/second super channel storage space for low speed and allocating a super channel including 5 channels for low speed to the E1 channel.

Brief Description of the Drawings

Other objects and aspects of the invention will become apparent from the following description of the embodiments with reference to the accompanying drawings, in which:

Fig. 1 is a block diagram illustrating an apparatus for allocating an E1 channel between a mobile switching center (MSC) and an interworking function (IWF) unit in a CDMA mobile communication system in accordance with the present invention;

Fig. 2A is a configuration of a transmission SI RAM

included in an apparatus for allocating an E1 channel between a mobile switching center (MSC) and an interworking function (IWF) unit in a CDMA mobile communication system in accordance with the present invention;

Fig. 2B is a configuration of a reception SI RAM included in an apparatus for allocating an E1 channel between a mobile switching center (MSC) and an interworking function (IWF) unit in a CDMA mobile communication system in accordance with the present invention;

Fig. 3 is a flow chart illustrating a method for allocating an E1 channel between a mobile switching center (MSC) and an interworking function (IWF) unit in a CDMA mobile communication system in accordance with the present invention;

Fig. 4A shows a signal flow through a super channel for high speed between a mobile switching center (MSC) and an interworking function (IWF) unit in a CDMA mobile communication system in accordance with the present invention; and

Fig. 4B shows a signal flow through a super channel for low speed between a mobile switching center (MSC) and an interworking function (IWF) unit in a CDMA mobile communication system in accordance with the present invention.

Detailed Description of the Preferred Embodiments

Fig. 1 is a block diagram illustrating an apparatus for allocating an E1 channel between a mobile switching center

(MSC) and an inter working function (IWF) unit in a CDMA system in accordance with the present invention.

The apparatus for allocating the E1 channel between the MSC and the IWF unit in the CDMA system can be embodied using an "MPC8260" chip architected by a Motorola Co.

The apparatus includes a channel buffer 100, a transmission SI RAM (SI RAM = serial interface routing RAM) 200, a reception SI RAM 300, a CPM (communication processor module) 400, a multi channel controlling unit 500 and a serial-parallel converting unit 600.

The channel buffer 100 receives call-processing data that are transmitted from a high-level processor and stores the same therein and also receives and stores call-processing data therein that are transmitted from the CPM 400.

The transmission SI RAM 200 is a routing table wherein a 16 bit entry is represented as bit or byte unit on a basis of one E1 and also a memory in which E1 channel allocation information is stored. The E1 channel allocation information is information of whether a transmission super channel including 5 channels will be employed or a transmission super channel including 10 channels will be employed, when call processing data is to be transmitted to a IWF unit 10. As shown in Fig. 2A, the transmission SI RAM 200 includes a first super channel storage zone for low speed 201 and a first super channel storage zone for high speed 202.

In this case, the first super channel storage zone for low speed 201 stores the E1 channel allocation information

about the transmission super channel including 5 channels therein.

Also, the first super channel storage zone for high speed 202 stores the E1 channel allocation information about the transmission super channel including 10 channels therein.

The reception SI RAM 300 is a routing table wherein a 16 bit entry is represented as bit or byte unit on a basis of one E1 and also a memory in which E1 channel allocation information is stored. The E1 channel allocation information is information of whether a transmission super channel including 5 channels will be employed or a transmission super channel including 10 channels will be employed, when call processing data is to be transmitted from the IWF unit 10. As shown in Fig. 2B, the reception SI RAM 300 includes a second super channel storage zone for low speed 301 and a second super channel storage zone for high speed 302.

In this case, the second super channel storage zone for low speed 301 stores the E1 channel allocation information about the reception super channel including 5 channels therein.

Also, the second super channel storage zone for high speed 302 stores the E1 channel allocation information about the reception super channel including 10 channels therein.

The communication processor module (CPM) 400 reads out the call processing data that are stored in the channel buffer 100 and then transmits the same to the serial-parallel converting unit 600. When the CPM 400 receives call processing data from the serial-parallel converting unit 600, the CPM 400

stores the same in the channel buffer 100.

When the CPM 400 receives call type information about a plurality of call types from the high-level processor during a call setup procedure, the CPM 400 determines which are more included in the plurality of call types, high speed calls or low speed calls based on the call type information.

If the low speed calls are more included, the CPM 400 modifies the E1 channel allocation information of the respective transmission/reception SI RAM 200/300 to thereby employ the E1 channel allocation information with the super channel including 5 channels. On the other hand, if the high speed calls are more included, the CPM 400 modifies the E1 channel allocation information of the transmission/reception SI RAM 200/300 to thereby employ the E1 channel allocation information with the super channel including 10 channels.

The multi channel controlling unit 500 reads out the E1 channel allocation information that is stored in the respective transmission/reception SI RAM 200/300 and then allocates the super channel including 5 channels for low speed or the super channel including 10 channels for high speed to the E1 channel.

Upon receiving the call processing data from the CPM 400, the serial-parallel converting unit 600 converts the same to serial data and then transmits the serial data to the IWF unit 10 through a corresponding super channel. Also, upon receiving the call processing data from the IWF unit 10 through a corresponding super channel, the serial-parallel converting

unit 600 converts the same to parallel data and then transmits the parallel data to the CPM 400.

Fig. 3 is a flow chart illustrating a method for allocating an E1 channel between a mobile switching center (MSC) and a IWF unit in a CDMA system in accordance with the present invention.

At the step S310, the CPM 400 receives call type information about a plurality of call types in process currently from the high-level processor.

At the step S320, the CPM 400 determines which are more included in the plurality of call types in process currently, high speed calls or low speed calls based on the call type information. Here, the high speed call represents an IS-95A service provided at 8/13 Kbps data rate and the low speed call represents an IS-95B service provided at 64Kbps data rate.

As a result of determination, if the high speed calls are more included in the plurality of call types in process currently, at the step S330, the CPM 400 designates the first/second super channel storage zone for high speed 202/302 of the respective transmission/reception SI RAM 200/300 as active regions and at this time, designates the first/second super channel storage zone for low speed 201/301 of the respective transmission/reception SI RAM 200/300 as shadow regions.

At the step S340, the multi channel controlling unit 500 reads out the E1 channel allocation information that is stored in each of first/second super channel storage zone for high

speed 202/302 of the respective transmission/reception SI RAM 200/300 and then allocates the super channel including 10 channels for high speed to the E1 channel. Accordingly, during one period time, it is performed to transmit the call processing data between the MSC and the IWF unit through the super channel including 10 channels for high speed in the CDMA system as shown in Fig. 4A.

As a result of determination, if the low speed calls are more included in the plurality of call types in process currently, at the step S350, the CPM 400 designates the first/second super channel storage zone for low speed 201/301 of the respective transmission/reception SI RAM 200/300 as active regions and at this time, designates the first/second super channel storage zone for high speed 202/302 of the respective transmission/reception SI RAM 200/300 as shadow regions.

At the step S360, the multi channel controlling unit 500 reads out the E1 channel allocation information that is stored in each of first/second super channel storage zone for low speed 201/301 of the respective transmission/reception SI RAM 200/300 and then allocates the super channel including 5 channels for low speed to the E1 channel. Accordingly, during one period time, it is performed to transmit the call processing data between the MSC and the IWF unit through the super channel including 5 channels for low speed in the CDMA system as shown in Fig. 4B.

As described above, by performing an apparatus and method

for allocating an E1 channel between the MSC and the IWF unit in the CDMA system in accordance with the present invention, the E1 channel can be variably allocated to support both the IS-95A and the IS-95B services provided respectively at low and high